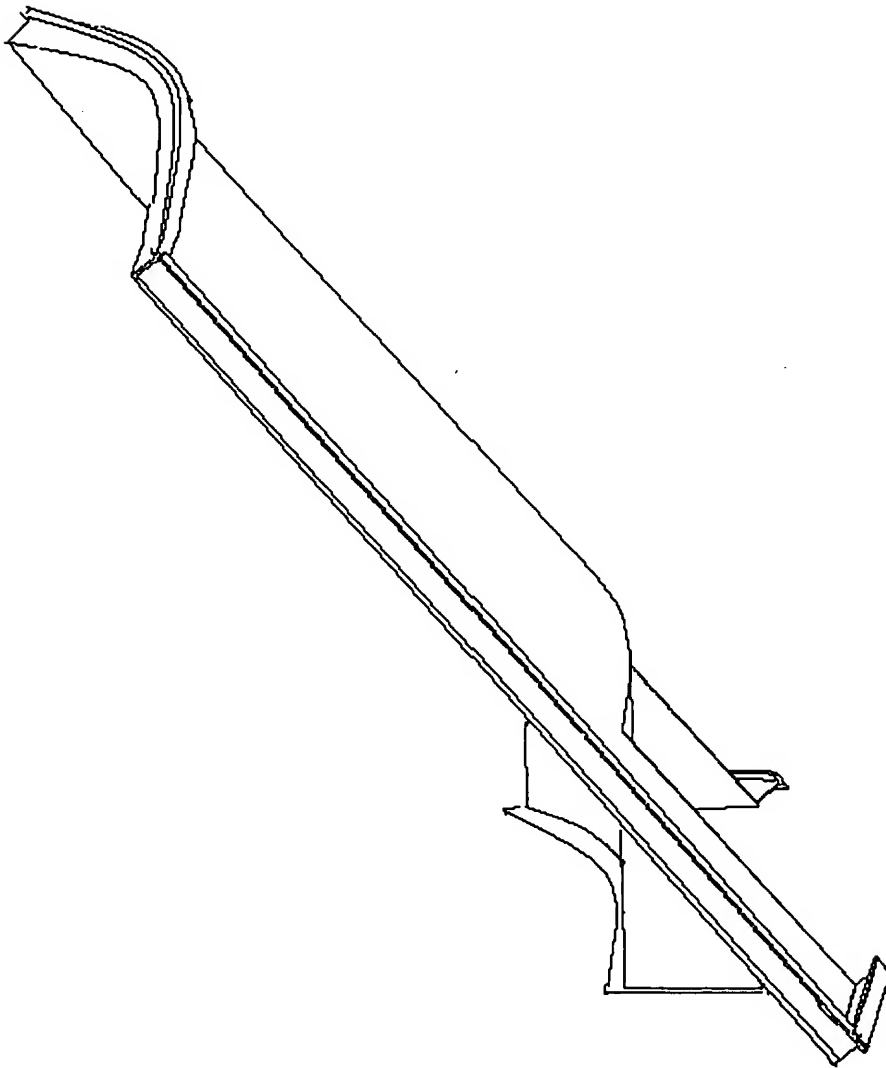


## THE WINDSHIELD HEATING AIR APPLIANCE

Inventor name Dennis Zhu Ouyang      Citizenship: U.S.      Residence: California

Permanent address: 1740 Robinwalk Lane, Unit A, Hoffman Estates, IL 60194



## CROSS-REFERENCE TO RELATED APPLICATIONS

Not Applicable

## STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

Not Applicable

## REFERENCE TO SEQUENCE LISTING, A TABLE, OR A COMPUTER PROGRAM LISTING COMPACT DISK APPENDIX

Not Applicable

## BACKGROUND OF THE INVENTION

### 1. Field of the Invention

- [1] The present invention is directed to devices designed to accomplish the following tasks:
- (1). To prevent fogging of the automobile windshield. (2). To enhance thawing of accumulated ice on the automobile windshield. (3). To reduce fogging of the automobile front side windows

### 2. Prior Art

- [2] Fogging is caused by condensed water vapor collecting on a glass surface due to the difference in temperature between the glass and the adjacent air. Air in contact with the inside surface of the windshield and side windows will thus cool down through contact with the glass, the cooling of this air reduces its ability to retain moisture, and thus the

moisture that is released condenses on the inside surface of the windshield and side windows. There are two different climate conditions in which fogging of the windshield and side windows occurs even though the automobile may have an adequate ventilation system. First, in a cold climate, it occurs when the inside temperature of the automobile differs significantly from the outside temperature. Secondly, in a wet climate such as a rainy day, it occurs when air humidity inside the automobile is very high and the rain and wind keep the windshield and side windows much cooler than air inside the automobile. When fogging of the windshield and side windows occurs, it significantly reduces the driver visibility through the windshield and side windows, increases the risk of traffic accidents.

- [3] Also, in a cold climate, an automobile cannot be operated until the ice accumulated on the windshield is melted and removed. To melt the ice, a fairly long time is required to preheat the automobile interior space.
- [4] Currently, there is no known simple and economic approach that can effectively address the driving safety concern related to fogging of the windshield and side windows in a wet or cold climate. On the other hand, there is also no known simple, economic and effective way to quickly melt the ice on the windshield in a cold climate. Therefore, it is the objective of the present invention to create a simple and economic solution to address the above issues effectively so that automobile industry will adapt the solution to make driving safer and easier. The characteristics of the present invention will become apparent in light of the present specification, including claims, and drawings.

## BRIEF SUMMARY OF THE INVENTION

- [5] It is an object of the present invention to prevent fogging of the windshield in a wet or cold climate and thereby to improve driving safety.
- [6] Another object of the present invention is to speed up the windshield ice melting in a cold climate so that an automobile can be operated almost immediately after the automobile engine warmed up.
- [7] Still another object of the present invention is to reduce fogging of the front side windows in a wet or cold climate to improve driving safety.
- [8] According to the present invention, the windshield heating air appliance is made of transparent plastic or other transparent material as Figure 1 and Figure 2 illustrate. The windshield, the windshield heating air appliance and the dashboard form a complete assembly henceforth referred as the “controlled heating air space” that is shown in Figure 9. The controlled heating air space can be quickly heated and maintained at an optimal temperature to prevent fogging of the windshield in a wet or cold climate, reducing the time required to melt the ice accumulated on the windshield in a cold climate.
- [9] According to the present invention, the front side window cover is made of transparent plastic or other transparent material as Figure 23 and Figure 24 illustrate; since air is a poor thermal conductor, an additional insulation layer, formed by the front side window cover and air inside of the front side window cover, keeps the front side window cover temperature close to the temperature of the internal automobile; therefore, effectively reduces fogging of the front side windows in a wet or cold climate.
- [10] The present invention has the following five major advantages:

- It provides a single solution to address multiple problems, which includes preventing fogging of the windshield, reducing fogging of the front side windows, and reducing time required to melt ice accumulated on the windshield.
- the windshield heating air appliance and front side window covers are inexpensive.
- It does not require any change in the automobile design.
- It does not consume automobile internal usable room.
- Its installation is simple and easy.

#### BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

- [11] The foregoing summary and the following detailed description may be better understood when read in conjunction with the accompanying drawings. Various embodiments are shown for the purpose of illustrating the invention. It is understood, however, that this invention is not limited to the precise arrangements shown.
- [12] Figure 1 shows a view from the outside of the automobile; Angle B of the dashboard support and the length of edges X and Y may vary based on size and position of the air vents. The windshield heating air appliance is attached to the windshield surface through the top, left, right and bottom T edges.
- [13] Figure 2 shows a view from the inside of the automobile; the dashboard support is attached to the dashboard surface.
- [14] Figure 3 shows a view from the outside of the automobile; the dashboard is shown at the bottom.
- [15] Figure 4 shows a view from the inside of the automobile; the dashboard is shown at the bottom.

- [16] Figure 5 shows a view from the outside of the automobile; the dashboard and the air vents are shown at the bottom.
- [17] Figure 6 shows a view from the outside of the automobile; the dashboard and the air vents are shown at the bottom.
- [18] Figure 7 shows shaded surfaces of the windshield heating air appliance are designed to attach to the windshield surface.
- [19] Figure 8 shows the bottom surface of the shaded portion is designed to attach to the dashboard surface.
- [20] Figure 9 shows that the windshield surface is represented by the solid thick line; the windshield heating air appliance surfaces are represented by the dashed line; the dashboard surface is represented by hatched lines at the bottom of the figure; this completes the assembly referred as the "controlled heating air space", which consumes less than 3% of the entire automobile interior space.
- [21] Figure 10 shows that a windshield-tinting device is shown in A; the windshield-tinting plastic is attached to a hard handle on the right as shown in B; two handle holders attached to the windshield heating air appliance shown in C are used to lock the windshield-tinting plastic handle.
- [22] Figure 11 shows another type of windshield-tinting plastic that has a series of holes located around its edges through which the windshield-tinting plastic is mounted on the windshield heating air appliance.
- [23] Figure 12 shows a windshield heating air appliance with two windshield-tinting plastics; two shaded surfaces represent two windshield-tinting plastics pulled out from the two windshield-tinting devices.

- [24] Figure 13 shows a windshield heating air appliance with a series of transparent plastic hollow columns that are mounts for installing windshield-tinting plastics as shown in Figure 11.
- [25] Figure 14 shows a windshield heating air appliance with two windshield-tinting plastics shown as shaded surfaces.
- [26] Figure 15 shows a view from the outside of the automobile; a rear view mirror base path is shown on the top.
- [27] Figure 16 shows a view from the inside of the automobile, a rear view mirror base path is shown on the top.
- [28] Figure 17 shows a left view from the outside of the automobile.
- [29] Figure 18 shows a different left view from the outside of the automobile.
- [30] Figure 19 shows a windshield heating air appliance related T edge sizes where the height is 1.5 inches and the width is 1.0 inches; the dashboard support edge size is 0.8 inches wide
- [31] Figure 20 shows the windshield heating air appliance L edge sizes where the height is 1.5 inches and the width is 0.8 inches.
- [32] Figure 21 shows the windshield heating air appliance having L edges rather than T edges.
- [33] Figure 22 shows that the windshield heating air appliance composed of two symmetric parts, which are joined together during the installation, to facilitate shipping.
- [34] Figure 23 shows a front view of the typical front side window cover.
- [35] Figure 24 shows an isometric view of the typical front side window cover.
- [36] Figure 25 shows edge sizes of the typical front side window cover.

## DETAILED DESCRIPTION OF THE INVENTION

- [37] According to the present invention, the windshield heating air appliance is made of the transparent plastic or other transparent materials. The top, left, right and bottom T or L edges of the windshield heating air appliance are designed to be attached to the windshield as shown in the shaded surfaces of Figure 7. The dashboard support edge is designed to attach to the dashboard as shown by the shaded surface in Figure 8. Figure 19 illustrates the dimensions of the T edge to be 1.5 inches tall and 1.0 inch wide and dashboard support edge to be 0.8 inches wide. Figure 20 illustrates the dimensions of the L edge to be 1.5 inches tall and 0.8 inches wide. Figure 5 and Figure 6 show the dashboard air vents are located between the windshield and the windshield heating air appliance. The windshield, the windshield heating air appliance and the dashboard form a complete assembly henceforth referred as the “controlled heating air space” in which the air can be quickly heated up and maintained at an optimal temperature through hot air supplied by the dashboard air vents. Thus, the moisture in the air is evaporated instantly, can no longer form a foggy layer on the windshield and windshield heating air appliance. This ensures the best driver visibility in a wet or cold climate.
- [38] Furthermore, “controlled heating air space” can maintain air at a relative high temperature in a cold climate, which can prevent a windshield from a dangerous “flash freeze” situation which may occur when water at or near freezing point strikes a relatively cool windshield while it is in motion, such as when cold water is splashed up onto a car windshield by a passing tractor-trailer.
- [39] According to the present invention, the front side window cover is made of transparent plastic or other transparent material; since air is a poor thermal conductor, the air



temperature between the front side window and the front side window cover is always higher than the front side window temperature in a wet or cold climate; therefore the additional insulation layer, formed by the front side window cover and the air inside of the front side window cover, enhances the front side window insulation, keeps the front side window cover temperature close to the temperature of the internal automobile; therefore significantly reduces fogging of the front side window in a wet or cold climate.

[40] When an automobile is parked in a parking lot or on the street in a cold climate, the normal practice to melt ice on the windshield is to preheat the automobile interior space which takes fairly long time. Since the “controlled heating air space” consumes less than 3% of an automobile interior space, it takes much less time to heat up the “controlled heating air space” compared to the entire automobile interior space. A shorter time to melt the ice on the windshield saves time and reduces pollution.

[41] The windshield-tinting device is another feature of the windshield heating air appliance. A rotatable windshield-tinting device as shown in Figure 10 is designed for simplicity. To use the windshield-tinting device when driving on a sunny day, pull out the windshield-tinting plastic hard handle and lock the hard handle into the two handle holders on the windshield heating air appliance as shown in Figure 12. To put away the windshield-tinting plastic, release the hard handle from the handle holders, the rotatable windshield-tinting device automatically rotates the windshield-tinting plastic out of view.

[42] Another windshield-tinting plastic design is shown in Figure 11. Each plastic windshield surface has a series of holes spreading on its edges, the windshield heating air appliance has a series of hollow columns as shown in Figure 13. The columns are used

as mounts for corresponding windshield-tinting plastics. Figure 12 shows the windshield heating air appliance with two windshield-tinting device.

- [43] Some automobile models have the rear view mirror base attached to the ceiling. Other automobiles have the rear view mirror base attached to the windshield. To handle the case where the rear view mirror base is attached to the windshield, the windshield heating air appliance shown in Figure 15 and Figure 16 has an open path to accommodate the rear view mirror.